CLAIMS

1. An image pickup apparatus, comprising:

image pickup means for picking up an image of an object;

an optical system arranged to cause the image to be formed on said image pickup means;

a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object;

a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters;

object-distance information detecting means for detecting an object distance indicative of a distance to the object;

convergence-distance deciding means for deciding, on the basis of the detected object distance, a convergence distance indicative of a distance to an intersection point of optical axes defined by said pair of mirrors; and

driving means for driving said pair of mirrors in such a way as to attain the decided convergence distance.

2. An image pickup apparatus according to claim 1, wherein said image pickup apparatus has a first mode in which the convergence distance is shorter than the object distance, a second mode in which the convergence distance is equal to the object distance, and a third mode in which the convergence distance is longer than the object distance, and

wherein said convergence-distance deciding means decides the convergence distance on the basis of one of the first mode, the second mode and the third mode.

3. An image pickup apparatus according to claim 2, further comprising selection means for selecting one of the first mode, the second mode and the third mode by a manual operation of a photographer,

wherein said convergence-distance deciding means decides the convergence distance on the basis of the mode selected by said selection means.

4. An image pickup apparatus according to claim 3, wherein said selection means selects one of the first mode, the second mode and the third mode by designating a numerical value.

5. An image pickup apparatus according to claim 4, further comprising display means for displaying the picked-up image,

wherein the numerical value to be designated by

said selection means is at least one of a numerical value normalized by a viewing distance to a display screen of said display means, an object distance, a reciprocal of the object distance, a numerical value normalized by the object distance, a viewing distance to the display screen of said display means, and a reciprocal of the viewing distance to the display screen of said display means.

6. An image pickup apparatus according to claim 5, further comprising storage means for storing, as data, a screen size of the display screen, a base length of said optical system, an image size of said image pickup means, and an amount of deviation from an optical axis of a position for detecting the object distance.

7. An image pickup apparatus according to claim 6, wherein the numerical value to be designated by said selection means is a numerical value normalized by a viewing distance to the display screen of said display means, and

wherein said convergence-distance deciding means computes an amount of parallax on the display screen on the basis of the normalized numerical value and a pupil distance, and computes the convergence distance on the basis of the computed amount of parallax, the base length, the image size, the screen size, the object distance and the amount of deviation from the optical axis.

8. An image pickup apparatus according to claim 3, further comprising storage means for storing, as a table, data of convergence distances corresponding to the selected mode and the detected object distance.

9. An image pickup apparatus according to claim 1, wherein said image pickup apparatus is composed of an optical unit and a photographing unit which are attachable to and detachable from each other,

said optical unit including said pair of shutters, said pair of mirrors, said optical system and said driving means, and

said photographing unit including said image pickup means.

10. A convergence-distance deciding method for an image pickup apparatus having a camera for picking up an image of an object, an optical system arranged to cause the image to be formed on said camera, a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object, a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters, and a distance measuring unit for detecting an object distance indicative of a distance to

the object, and arranged to drive said pair of mirrors in such a way as to attain a decided convergence angle, said convergence-distance deciding method comprising:

a step of detecting the object distance;

a step of selecting, by a manual operation of a photographer, one of a first mode in which the convergence distance is shorter than the object distance, a second mode in which the convergence distance is equal to the object distance, and a third mode in which the convergence distance is longer than the object distance; and

a step of deciding the convergence distance on the basis of the selected mode and the detected object distance.

11. A storage medium which stores therein a program to be executed by a computer for controlling an image pickup apparatus having a camera for picking up an image of an object, an optical system arranged to cause the image to be formed on said camera, a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object, a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters, and a distance measuring unit for

detecting an object distance indicative of a distance to the object, and arranged to drive said pair of mirrors in such a way as to attain a decided convergence angle, said program comprising:

a process of detecting the object distance;

a process of selecting, by a manual operation of a photographer, one of a first mode in which the convergence distance is shorter than the object distance, a second mode in which the convergence distance is equal to the object distance, and a third mode in which the convergence distance is longer than the object distance; and

a process of deciding the convergence distance on the basis of the selected mode and the detected object distance.

12. An optical apparatus, comprising:

an optical system arranged to cause an image of an object to be formed on image pickup means;

a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object;

a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters;

object-distance information detecting means for detecting an object distance indicative of a distance to the object;

convergence-distance deciding means for deciding, on the basis of the detected object distance, a convergence distance indicative of a distance to an intersection point of optical axes defined by said pair of mirrors; and

driving means for driving said pair of mirrors in such a way as to attain the decided convergence distance.

13. An optical apparatus according to claim 12, wherein said optical apparatus has a first mode in which the convergence distance is shorter than the object distance, a second mode in which the convergence distance is equal to the object distance, and a third mode in which the convergence distance is longer than the object distance, and

wherein said convergence-distance deciding means decides the convergence distance on the basis of one of the first mode, the second mode and the third mode.

14. An optical apparatus according to claim 13, further comprising selection means for selecting one of the first mode, the second mode and the third mode by a manual operation of a photographer,

wherein said convergence-distance deciding means

decides the convergence distance on the basis of the mode selected by said selection means.

15. An optical apparatus according to claim 14, wherein said selection means selects one of the first mode, the second mode and the third mode by designating a numerical value.

16. An optical apparatus according to claim 15, further comprising display means for displaying the picked-up image,

wherein the numerical value to be designated by said selection means is at least one of a numerical value normalized by a viewing distance to a display screen of said display means, an object distance, a reciprocal of the object distance, a numerical value normalized by the object distance, a viewing distance to the display screen of said display means, and a reciprocal of the viewing distance to the display screen of said display means.

17. An optical apparatus according to claim 16, further comprising storage means for storing, as data, a screen size of the display screen, a base length of said optical system, an image size of said image pickup means, and an amount of deviation from an optical axis of a position for detecting the object distance.

18. An optical apparatus according to claim 17,

wherein the numerical value to be designated by said selection means is a numerical value normalized by a viewing distance to the display screen of said display means, and

wherein said convergence-distance deciding means computes an amount of parallax on the display screen on the basis of the normalized numerical value and a pupil distance, and computes the convergence distance on the basis of the computed amount of parallax, the base length, the image size, the screen size, the object distance and the amount of deviation from the optical axis.

19. An optical apparatus according to claim 14, further comprising storage means for storing, as a table, data of convergence distances corresponding to the selected mode and the detected object distance.

20. An image pickup apparatus, comprising:

image pickup means for picking up an image of an object;

an optical system arranged to cause the image to be formed on said image pickup means;

a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object;

a pair of mirrors disposed symmetrically with

respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters;

focus control means for performing automatic focus control of said optical system;

distance-measurement-area setting means for setting, within a distance measurement frame for the automatic focus control, a distance measurement area for an object distance indicative of a distance to the object;

object-distance detecting means for detecting the object distance in the set distance measurement area;

convergence-distance deciding means for deciding, on the basis of the detected object distance, a convergence distance indicative of a distance to an intersection point of optical axes defined by said pair of mirrors; and

driving means for driving said pair of mirrors in such a way as to attain the decided convergence distance.

21. An image pickup apparatus according to claim 20, further comprising distance-measurement-frame setting means for setting, within a reading area of said image pickup means, the distance measurement frame for the automatic focus control.

22. An image pickup apparatus according to claim 21, wherein the distance measurement frame for the automatic focus control is set at three portions, including a middle portion and portions on both sides thereof, of the reading area of said image pickup means, and the distance measurement area for the object distance is set within the distance measurement frame set at each of the three portions.

23. An image pickup apparatus according to claim 20, wherein said image pickup apparatus is composed of an optical unit and a photographing unit which are attachable to and detachable from each other,

said optical unit including said pair of shutters, said pair of mirrors, said optical system and said driving means, and

said photographing unit including said image pickup means.

24. An image pickup apparatus according to claim 20, wherein said object-distance detecting means detects the object distance by using a trigonometric distance measurement principle.

25. A convergence-distance deciding method for an image pickup apparatus having a camera for picking up an image of an object, an optical system arranged to cause the image to be formed on said camera, a pair of shutters

disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object, a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters, a focus control part for performing automatic focus control of said optical system, and a distance measuring unit for detecting an object distance indicative of a distance to the object, and arranged to drive said pair of mirrors in such a way as to attain a decided convergence angle, said convergence-distance deciding method comprising:

a step of setting, within a distance measurement frame for the automatic focus control, a distance measurement area for the object distance;

a step of detecting the object distance in the set distance measurement area; and

a step of deciding, on the basis of the detected object distance, a convergence distance indicative of a distance to an intersection point of optical axes defined by said pair of mirrors.

26. A storage medium which stores therein a program to be executed by a computer for controlling an image pickup apparatus having a camera for picking up an image of an object, an optical system arranged to cause the

image to be formed on said camera, a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object, a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters, a focus control part for performing automatic focus control of said optical system, and a distance measuring unit for detecting an object distance indicative of a distance to the object, and arranged to drive said pair of mirrors in such a way as to attain a decided convergence angle, said program comprising:

a process of setting, within a distance measurement frame for the automatic focus control, a distance measurement area for the object distance;

a process of detecting the object distance in the set distance measurement area; and

a process of deciding, on the basis of the detected object distance, a convergence distance indicative of a distance to an intersection point of optical axes defined by said pair of mirrors.

27. An optical apparatus, comprising:

two shutters arranged to time-divisionally transmit right and left parallactic images alternately;

an optical system arranged to cause the right

and left parallactic images transmitted by said two shutters to be formed on an image pickup plane of image pickup means; and

shutter control means for controlling said two shutters by generating driving signals synchronized with a period of formation of an image signal by said image pickup means.

28. An optical apparatus according to claim 27, wherein said two shutters are right and left liquid crystal shutters for alternately transmitting and blocking the right and left parallactic images, and

wherein said shutter control means is arranged to alternately open and close said right and left liquid crystal shutters in synchronism with a synchronizing signal of an image signal outputted from said image pickup means.

29. An optical apparatus according to claim 28, wherein said optical system is composed of four mirrors arranged to cause the right and left parallactic images transmitted by said two shutters to enter said image pickup plane, and a plurality of lens groups.

30. An optical apparatus according to claim 28, wherein said optical apparatus is a lens unit attachable to and detachable from a camera body through a mount part, said image pickup means being disposed at said

camera body.

31. An optical apparatus according to claim 30, wherein said mount part has input means for inputting a video signal from said camera body, and said synchronizing signal is a vertical synchronizing signal extracted from the inputted video signal.

32. A camera apparatus, to and from which an optical apparatus according to claim 27 is attachable and detachable, said camera apparatus comprising said image pickup means, signal processing means for applying predetermined processing to right and left image signals corresponding to the right and left parallactic images outputted from said image pickup means and for outputting the processed image signals, and output means for transmitting to said optical apparatus a signal corresponding to a period of formation of an image signal by said image pickup means.

33. A camera system, comprising:

a lens unit comprising two shutters arranged to time-divisionally transmit right and left parallactic images alternately, an optical system arranged to cause the right and left parallactic images transmitted by said two shutters to be formed on an image pickup plane of image pickup means, and shutter control means for controlling said two shutters by generating driving

signals synchronized with a period of formation of an image signal by said image pickup means; and

a camera body to and from which said lens unit is attachable and detachable, said camera body comprising said image pickup means, signal processing means for applying predetermined processing to right and left image signals corresponding to the right and left parallactic images outputted from said image pickup means and for outputting the processed image signals, and output means for transmitting to said lens unit a signal corresponding to a period of formation of an image signal by said image pickup means.

34. A camera system according to claim 33, wherein said two shutters are right and left liquid crystal shutters for alternately transmitting and blocking the right and left parallactic images, and wherein said shutter control means is arranged to alternately open and close said right and left liquid crystal shutters in synchronism with a synchronizing signal of an image signal outputted from said image pickup means.

35. A camera system according to claim 34, wherein said optical system is composed of four mirrors arranged to cause the right and left parallactic images transmitted by said two shutters to enter said image pickup plane, and a plurality of lens groups.

36. An optical apparatus, comprising:

an optical system arranged to cause an image of an object to be formed on image pickup means;

a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object;

a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters;

focus control means for performing automatic focus control of said optical system;

distance-measurement-area setting means for setting, within a distance measurement frame for the automatic focus control, a distance measurement area for an object distance indicative of a distance to the object;

object-distance detecting means for detecting the object distance in the set distance measurement area;

convergence-distance deciding means for deciding, on the basis of the detected object distance, a convergence distance indicative of a distance to an intersection point of optical axes defined by said pair of mirrors; and

driving means for driving said pair of mirrors in such a way as to attain the decided convergence

distance.

37. An optical apparatus according to claim 36, further comprising distance-measurement-frame setting means for setting, within a reading area of said image pickup means, the distance measurement frame for the automatic focus control.

38. An optical apparatus according to claim 37, wherein the distance measurement frame for the automatic focus control is set at three portions, including a middle portion and portions on both sides thereof, of the reading area of said image pickup means, and the distance measurement area for the object distance is set within the distance measurement frame set at each of the three portions.

39. An optical apparatus according to claim 36, wherein said object-distance detecting means detects the object distance by using a trigonometric distance measurement principle.

40. An image pickup apparatus, comprising:

image pickup means for picking up an image of an object;

an optical system arranged to cause the image to be formed on said image pickup means;

a pair of shutters disposed symmetrically with

respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object;

a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters;

display means for displaying the image picked up by said image pickup means;

input means for inputting information relating to said display means;

convergence-distance deciding means for deciding, on the basis of the inputted information, a convergence distance indicative of a distance to an intersection point of optical axes defined by said pair of mirrors; and

driving means for driving said pair of mirrors in such a way as to attain the decided convergence distance.

41. An image pickup apparatus according to claim 40, wherein said image pickup apparatus is composed of an optical unit and a photographing unit which are attachable to and detachable from each other,

said optical unit including said pair of shutters, said pair of mirrors, said optical system and said driving means, and

said photographing unit including said image pickup means and said display means.

42. An image pickup apparatus according to claim 40, further comprising object-distance information detecting means for detecting an object distance indicative of a distance to the object,

wherein the information relating to said display means includes a screen size of said display means and a viewing distance from an approximate position of eyes of an observer to a display position of said display means, and

wherein said convergence-distance deciding means includes computing means for computing a photographable range on the basis of the screen size, the viewing distance, a size of said image pickup means, a focal length of said optical system, an interval between optical axes of the right and left parallactic images, and a pupil distance of a human being, and decides the convergence distance on the basis of the computed photographable range and the detected object distance.

43. An image pickup apparatus according to claim 42, wherein said convergence-distance deciding means decides the convergence distance in such a way as to cause at least a part of the detected object distance to be included within the computed photographable range.

44. An image pickup apparatus according to claim 40, wherein said input means has a display screen and a switch for inputting information displayed on said display screen.

45. An image pickup apparatus according to claim 44, wherein a screen of said display means on which the image picked up by said image pickup means is displayed is used also as said display screen.

46. A convergence-distance deciding method for an image pickup apparatus having a camera for picking up an image of an object, an optical system arranged to cause the image to be formed on said camera, a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object, a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters, a monitor for displaying the image picked up by said camera, and a distance measuring unit for detecting an object distance indicative of a distance to the object, and arranged to drive said pair of mirrors in such a way as to attain a decided convergence angle, said convergence-distance deciding method comprising:

a step of detecting the object distance;

a step of inputting, as information relating to said monitor, a screen size of said monitor and a viewing distance from an approximate position of eyes of an observer to a display position of said monitor;

a step of computing a photographable range on the basis of the screen size, the viewing distance, a size of an image pickup plane of said camera, a focal length of said optical system, an interval between optical axes of the right and left parallactic images, and a pupil distance of a human being; and

a step of deciding the convergence distance on the basis of the computed photographable range and the detected object distance.

47. A storage medium which stores therein a program to be executed by a computer for controlling an image pickup apparatus having a camera for picking up an image of an object, an optical system arranged to cause the image to be formed on said camera, a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object, a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters, a monitor for displaying the image picked up by said camera, and a distance measuring unit

for detecting an object distance indicative of a distance to the object, and arranged to drive said pair of mirrors in such a way as to attain a decided convergence angle, said program comprising:

a process of detecting the object distance;

a process of inputting, as information relating to said monitor, a screen size of said monitor and a viewing distance from an approximate position of eyes of an observer to a display position of said monitor;

a process of computing a photographable range on the basis of the screen size, the viewing distance, a size of an image pickup plane of said camera, a focal length of said optical system, an interval between optical axes of the right and left parallactic images, and a pupil distance of a human being; and

a process of deciding the convergence distance on the basis of the computed photographable range and the detected object distance.

48. An optical apparatus, comprising:

an optical system arranged to cause an image of an object to be formed on image pickup means;

a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object;

a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and

arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters;

display means for displaying the image picked up by said image pickup means;

input means for inputting information relating to said display means;

convergence-distance deciding means for deciding, on the basis of the inputted information, a convergence distance indicative of a distance to an intersection point of optical axes defined by said pair of mirrors; and

driving means for driving said pair of mirrors in such a way as to attain the decided convergence distance.

49. An optical apparatus according to claim 48, further comprising object-distance information detecting means for detecting an object distance indicative of a distance to the object,

wherein the information relating to said display means includes a screen size of said display means and a viewing distance from an approximate position of eyes of an observer to a display position of said display means, and

wherein said convergence-distance deciding means includes computing means for computing a photographable range on the basis of the screen size, the viewing

distance, a size of said image pickup means, a focal length of said optical system, an interval between optical axes of the right and left parallactic images, and a pupil distance of a human being, and decides the convergence distance on the basis of the computed photographable range and the detected object distance.

50. An optical apparatus according to claim 49, wherein said convergence-distance deciding means decides the convergence distance in such a way as to cause at least a part of the detected object distance to be included within the computed photographable range.

51. An optical apparatus according to claim 48, wherein said input means has a display screen and a switch for inputting information displayed on said display screen.

52. An optical apparatus according to claim 51, wherein a screen of said display means on which the image picked up by said image pickup means is displayed is used also as said display screen.

53. An image pickup apparatus, comprising:

image pickup means for picking up an image of an object;

an optical system arranged to cause the image to be formed on said image pickup means;

a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object;

a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters;

object-distance detecting means for detecting an object distance indicative of a distance to the object;

driving means for driving said pair of mirrors in such a way as to attain a convergence distance corresponding to the detected object distance; and

mode changeover means for changing over a mode of said image pickup apparatus between a three-dimensional photographing mode in which the right and left parallactic images reflected by said pair of mirrors are picked up and a two-dimensional photographing mode in which only the image reflected by one of said pair of mirrors is picked up.

54. An image pickup apparatus according to claim 53, wherein said mode changeover means is a changeover switch operable by a photographer.

55. An image pickup apparatus according to claim 53, wherein the three-dimensional photographing mode

includes an automatic tracking mode in which said pair of mirrors are driven in association with the object distance continuously detected by said object-distance detecting means, a one-shot mode in which said pair of mirrors are driven in association with the object distance detected by said object-distance detecting means only when a predetermined switch is depressed, and a manual mode in which said pair of mirrors are driven in association with a manual operation, and

wherein said mode changeover means is able to change over the three-dimensional photographing mode to one of the automatic tracking mode, the one-shot mode and the manual mode.

56. An image pickup apparatus according to claim 53, wherein, in the two-dimensional photographing mode, respective optical axes of said pair of mirrors and an optical axis of said optical system are located within one and the same plane and are approximately parallel with one another.

57. An image pickup apparatus according to claim 55, wherein, during the automatic tracking mode, said driving means drives said pair of mirrors at a speed lower than during the one-shot mode.

58. A convergence control method for an image pickup apparatus having a camera for picking up an image

of an object, an optical system arranged to cause the image to be formed on said camera, a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object, a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters, and a distance measuring unit for detecting an object distance indicative of a distance to the object, and arranged to drive said pair of mirrors in such a way as to attain a convergence distance corresponding to the detected object distance, said convergence control method comprising:

a step of changing over a mode of said image pickup apparatus between a three-dimensional photographing mode and a two-dimensional photographing mode;

a step of, when the mode of said image pickup apparatus has been changed over to the three-dimensional photographing mode, driving said pair of mirrors in such a way as to attain a convergence distance corresponding to the detected object distance, and picking up the right and left parallactic images reflected by said pair of mirrors; and

a step of, when the mode of said image pickup apparatus has been changed over to the two-dimensional

photographing mode, picking up only the image reflected by one of said pair of mirrors.

59. A storage medium which stores therein a program to be executed by a computer for controlling an image pickup apparatus having a camera for picking up an image of an object, an optical system arranged to cause the image to be formed on said camera, a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object, a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters, and a distance measuring unit for detecting an object distance indicative of a distance to the object, and arranged to drive said pair of mirrors in such a way as to attain a convergence distance corresponding to the detected object distance, said program comprising:

a process of changing over a mode of said image pickup apparatus between a three-dimensional photographing mode and a two-dimensional photographing mode;

a process of, when the mode of said image pickup apparatus has been changed over to the three-dimensional photographing mode, driving said pair of mirrors in such

a way as to attain a convergence distance corresponding to the detected object distance, and picking up the right and left parallactic images reflected by said pair of mirrors; and

a process of, when the mode of said image pickup apparatus has been changed over to the two-dimensional photographing mode, picking up only the image reflected by one of said pair of mirrors.

60. An optical apparatus, comprising:

an optical system arranged to cause an image of an object to be formed on image pickup means;

a pair of shutters disposed symmetrically with respect to an optical axis of said optical system and arranged to time-divisionally transmit right and left parallactic images of the object;

a pair of mirrors disposed symmetrically with respect to the optical axis of said optical system and arranged to respectively reflect and lead to said optical system the right and left parallactic images transmitted by said pair of shutters;

object-distance detecting means for detecting an object distance indicative of a distance to the object;

driving means for driving said pair of mirrors in such a way as to attain a convergence distance corresponding to the detected object distance; and

mode changeover means for changing over a mode of said optical apparatus between a three-dimensional

photographing mode in which the right and left parallactic images reflected by said pair of mirrors are picked up and a two-dimensional photographing mode in which only the image reflected by one of said pair of mirrors is picked up.

61. An optical apparatus according to claim 60, wherein said mode changeover means is a changeover switch operable by a photographer.

62. An optical apparatus according to claim 60, wherein the three-dimensional photographing mode includes an automatic tracking mode in which said pair of mirrors are driven in association with the object distance continuously detected by said object-distance detecting means, a one-shot mode in which said pair of mirrors are driven in association with the object distance detected by said object-distance detecting means only when a predetermined switch is depressed, and a manual mode in which said pair of mirrors are driven in association with a manual operation, and

wherein said mode changeover means is able to change over the three-dimensional photographing mode to one of the automatic tracking mode, the one-shot mode and the manual mode.

63. An optical apparatus according to claim 60, wherein, in the two-dimensional photographing mode,

respective optical axes of said pair of mirrors and an optical axis of said optical system are located within one and the same plane and are approximately parallel with one another.

64. An optical apparatus according to claim 60, wherein, during the automatic tracking mode, said driving means drives said pair of mirrors at a speed lower than during the one-shot mode.